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Spillover Effects in Healthcare Programs: Evidence on Social Norms and Information Sharing

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Ciro Avitabile*

Abstract
Although cervical cancer is considered one of the most preventable types of cancer, mortality rates in many developing countries are extremely high. This paper exploits the randomized research design of a large welfare program - PROGRESA - to study the size and determinants of spillover effects in cervical cancer screening in rural Mexico. I find significant evidence of increased demand for Papanicolaou cervical cancer screening among women ineligible for the transfer, yet no evidence of similar externalities in non-gender specific tests, such as blood pressure and blood sugar checks. Different pieces of evidence from the randomized evaluation sample and the nationwide rollout are consistent with the hypothesis that the PROGRESA program has weakened the social norm related to husbands' opposition to screening of their wives by male doctors. I find no support for the hypothesis that the spillover effect is driven by higher levels of health information.

Keywords: Cervical cancer, Social norm, Information sharing, Progresa

JEL Classification: D83, I12, J16

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1 Introduction

Cervical cancer is the second most common cancer in women and, in 2005, was responsible for 250,000 deaths, approximately 80% of these in developing countries (World Health Organization, 2006). In contrast to other types of cancer, early detection of cervical cancer can virtually eliminate the mortality risk. In this paper I use data from *PROGRESA*, a large conditional cash transfer program implemented in rural Mexico, to study whether a welfare program that provides financial incentives for preventive treatments can affect the propensity to screen for cervical cancer among individuals who are not eligible for the transfer, and whether this indirect effect can be explained by the presence of gender related social norms and lack of information.

While there is ongoing debate in many developed countries on the benefits and costs of breast cancer screening, programs to detect cervical cancer have been unanimously hailed as successful. Cervical cancer has recognized and well-described risk factors. There is an identifiable precancerous condition, the human papilloma virus (HPV); a safe and cheap test (the Papanicolaou (PAP) smear test) for detecting precancer and cancer exists; once detected at an early stage, cancerous cells can be removed with a relatively simple and inexpensive surgical treatment. The systematic use of PAP tests has led to a huge drop in cervical cancer mortality in developed countries. However, this is not the case in developing countries, Mexico being one of the most striking examples. Despite the existence of a national cervical cancer screening program (CCSP) since 1974, the percentage of Mexican women who regularly get screened for cervical cancer is well below the OECD country average, and lack of compliance with cervical cancer screening advice is dramatically high in rural areas (Lazcano-Ponce, 1997; Watkins et al., 2002). While the absence of screening is strongly correlated with low socioeconomic status, the mechanisms driving this correlation are largely unexplored.

In this paper I focus on gender related social norms and lack of information as potential explanations for the low take up of cervical cancer screening in rural Mexico and I study whether a large scale policy intervention, such as *PROGRESA*, can attenuate the effects of these two non-market mechanisms on the decision to screen for female specific health conditions. I exploit the randomized research design of the *PROGRESA* evaluation sample to test whether the screening behavior responses of women who are eligible for the conditional cash transfer and those who are not are consistent with the predictions of a social norm diffusion model and a social learning model. Finally, I test whether long run evidence on the expansion of the *PROGRESA* program is consistent with the results from the randomized evaluation sample.

PROGRESA was introduced in 1997 and is still ongoing. Two of its features make it the ideal context to study the presence of spillover effects in the demand for medical screening. First, the evaluation of the program is based on a village level randomized design. From a group of 506 villages, 320 were randomly assigned to be in the treatment group for the *PROGRESA* program starting in May 1998, and 186 were assigned to a control group for the program phase starting in November 1999. Data are available for all households in every village, both poor and non-poor, although only poor households are eligible for the transfer.[1] Second, under the conditions of the program, members of eligible households, both adults and children, are required to submit to regular health checks and to attend health-related talks. In particular, eligible adults have to undergo full preventive screenings: the PAP smear test is female specific, but both male and female household members have their blood pressure and blood sugar levels tested.

There is limited evidence on the existence and magnitude of spillover effects across individuals in active health-seeking behavior.[2] From a social perspective, the cost effectiveness of a medical screening program might change substantially in the presence of externalities (Christakis, 2004).[3] In the first part of the paper I study the effect of *PROGRESA* on demand for cervical cancer screening by ineligible households compared to demand for non-gender specific screening tests. In order to disentangle the effect of the program on demand for and supply of screening, I exploit the variation across villages in health center waiting time, that acts as the price of the health services. My results show that the indirect treatment effect (ITE) of *PROGRESA* on the propensity to screen for cervical cancer is positive, non trivial and significantly different from zero. I do not find any significant indirect effect on the probability of screening for diabetes and high blood pressure (hypertension), or attending a health center. I provide evidence that rules out the possibility that the indirect effect of *PROGRESA* on cervical cancer screening is due to income spillovers from eligible to ineligible households and to changes in the supply of health provisions.

In the second part of the paper, I analyze to what extent gender related social norms and information sharing can explain the indirect effect of the program on cervical cancer screening. There is an increasing attention among economists on understanding how cul-

[1] From now onwards I will use the terms non-poor and ineligible, or poor and eligible, interchangeably, as each pair identifies the same group of households.

[2] Miguel and Kremer (2004) using evidence from a randomized experiment show that a deworming program in Kenya significantly reduced infection rates among children not receiving the treatment.

[3] A related strand of literature (see Dow et al., 1999) argues that, as implied by the competing risk model, complementarities between diseases might alter the evaluation of cause-specific health programs.

tural factors and social norms affect utilization of health services.[4] Qualitative evidence on Mexico, collected via the evaluation of *PROGRESA* (Adato et al., 2000) and by various epidemiological studies (Lazcano-Ponce, 1997; Watkins et al., 2002), shows that one of the most common reasons why women do not attend PAP smear testing is male opposition to wives being checked by male doctors. I investigate whether *PROGRESA* increased the social acceptability of the smear test. I propose a simple model of social norm diffusion in which the individual utility from screening depends on the action of other individuals in the locality, and women differ in the cost associated with the social norm that regulates screening for gender specific diseases. In this framework, *PROGRESA* provides an economic incentive to screen only for poor households, thus determining an increase in the fraction of people in the locality who attend for screening. The model has three main empirical predictions: 1) for socially regulated screening tests the effect of *PROGRESA* on both ineligible and eligible households should vary with the fraction of poor households in the locality; 2) the intensity of the effect of *PROGRESA* with respect to the fraction of poor households should be stronger among women who potentially are more affected by the social norm; 3) there should be no significant interaction between the effect of *PROGRESA* and the fraction of poor households for non-gender specific screening tests, such as high blood pressure and diabetes.

An alternative explanation for the indirect effect of *PROGRESA* on cervical cancer screening is related to the availability of more information.[5] Women in ineligible households might learn from eligible women - either by word of mouth or simply observing their behavior[6] - about the risk factors associated with cervical cancer and the benefits of screening. A learning-based explanation implies that women only care about the screening behavior of other women in the locality to the extent that it conveys useful information, but their payoff from screening is not directly affected by others' actions. Using a standard normal learning model,[7] I obtain three additional implications. First, information plays a key role

[4] Luke and Munshi (2007) study how caste affiliation affects investment in children's health in India. Almond et al. (2009) find that the reproduction behavior of Asian immigrants in Canada responds to cultural preferences for sons.

[5] Lange (2011) uses data from the National Health Interview Survey (NHIS) on real and perceived cancer risks and cancer screening behavior to provide evidence for the US on the role of health information as one of the mechanisms behind the correlation between education and the propensity to screen. Dupas (2011) exploits a randomized experiment in Kenya to show that providing information on the relative risk of HIV infection by partner's age led to a large a significant decrease in unprotected sex among teenage women.

[6] Both mechanisms have been extensively studied in economic theory. Ellison and Fudenberg (1995) analyze how individual information is aggregated through word of mouth. Banerjee (1992) and Bikhchandani et al. (1992) are the seminal works on observational learning.

[7] This framework has been used to model learning in the adoption of agricultural technology (e.g.,

in both the prevention and treatment of hypertension and diabetes. Therefore, if ineligible households learn from eligible ones about health risk factors and the benefits of screening, I would expect the propensity for ineligible households to screen for these other conditions also to increase with the fraction of eligibles. Second, the importance of social learning should be systematically different for eligible and ineligible households. In order to qualify for the transfer eligible members have to attend health and hygiene related courses where they are given information on various health issues including cervical cancer, high blood pressure and diabetes. Since eligible households can rely on this additional source of information, information received from their peers should matter less than for ineligible household members. Third, the learning externality should be bigger among individuals whose initial level of information about cervical cancer risk factors is less precise.

I combine the features of the *PROGRESA* evaluation sample with the variation in female emancipation between male headed and female headed (widowed) households to test the empirical predictions of the social norm and the social learning models. Overall, the three empirical predictions of the social norm model are remarkably consistent with the data, but there is little evidence to support a social learning explanation.

The *PROGRESA* program, later renamed *Oportunidades*, has been extended gradually to the entire country. The 2007 survey differs from previous ones in collecting detailed information on health centers and the characteristics of doctors including age, qualifications and, most important for this study, their sex. Therefore, I am able to test directly whether the effect of *PROGRESA* on gender specific screening tests is related to the presence of male doctors. I find that living in a locality with longer exposure to *PROGRESA* increases the probability of screening for cervical and breast cancer and, consistent with the social norm based explanation, the effect is significantly stronger in those localities where there is a higher proportion of male doctors. Longer exposure to *PROGRESA* does not affect women's propensity to screen for diabetes, hypertension or cholesterol. Using direct questions on the health related knowledge of young people and teenagers, I do not find any evidence that women who live in localities where the program has been in place for longer are better informed about the PAP smear test and sexually transmitted diseases.

This paper contributes to several strands of the literature. Attention on the importance of social norms as determinants of individual behavior has increased.[8] Much of the work

Foster and Rosenzweig, 1995; Bandiera and Rasul, 2006) and consumption decisions (Moretti, 2011).

[8] Among others, Ichino and Maggi (2000) study absenteeism and misconduct among the employees of an Italian bank and find that region of origin in Italy is a predictor of shirking. Fisman and Miguel (2007) study the role of culture as a determinant of corruption and find that UN diplomats from highly corrupt countries are more likely to accumulate a higher number of unpaid parking fines.

on the importance of cultural background for health related decisions focuses on fertility and compares outcomes for individuals from different countries of origin (see Fernández and Fogli (2006) for the US and Almond et al. (2009) for Canada). This work contributes by providing a specific example of a gender related cultural norm that affects the demand for medical screening. More important, this is the first work to provide evidence that large scale interventions, such as the *PROGRESA* program, can have significant effects on the social norms that regulate individual behavior.[9]

This paper contributes also to a recent body of work on the indirect effects of welfare programs. Angelucci and De Giorgi (2009) provide evidence that *PROGRESA* increased the consumption of ineligible households operating through insurance and credit market mechanisms. Angelucci et al. (2010b) uses information on the surnames of household partners to study the role of the extended family in shaping the indirect effect of *PROGRESA* on consumption and investment.[10] This paper contributes by providing evidence that *PROGRESA* affects the behavior of ineligible households through non-market mechanisms.

There is a recent empirical literature that studies the mechanisms through which peers affect *experience goods* consumption. Among others, Cai et al. (2009) exploits a randomized natural field experiment to study the presence of observational learning on menu items in restaurants. Moretti (2011), using box-office data, provides empirical evidence of the effect of social learning on movie choice. This study provides evidence on the effect of social pressure on the decision to consume a particular type of experience good, that is preventive screening, in a developing country context.

The paper is organized as follows. In Section 2 I provide background information on female specific conditions in Mexico, I describe the *PROGRESA* program and my data. Section 3 presents descriptive evidence on sociodemographic characteristics of the sample, and how the program has affected the supply of health provision and screening rates for gender and non-gender specific conditions. Section 4 proposes a simple model to identify the program's demand effect and supply effect and presents some baseline evidence. Section 5 discusses and provides empirical evidence on two mechanisms that might explain the indirect effect, namely social norm and information sharing. In Section 6 I test whether the

[9] Di Tella et al. (2007) exploit a natural experiment that induced exogenous allocation of property rights, to study the formation of pro-market beliefs among squatters.

[10] Bobonis and Finan (2009) find that *PROGRESA* significantly increased school enrollment among ineligible families through a peer effect. Lalive and Cattaneo (2009) find evidence of a social interaction effect in school attendance among ineligible children and argue that it might be driven by a change in parents' perceptions of children's ability. Angelucci et al. (2010a) does not find robust evidence that the program has a higher than average effect on secondary school enrolment among children living in ineligible households.

conclusions based on the randomized evaluation sample are supported by long run evidence on the expanded program. Section 7 concludes.

2 Background

2.1 Gender specific diseases in Mexico

The Human Papilloma virus (HPV) has been identified as the main cause of cervical cancer (present in 99.7% of cases). HPV is believed to be the most common sexually transmitted infection and most sexually active people suffer at least one HPV infection during their lifetime, usually without knowing it. Persistent infection involving a subset of some dozen or so "high risk" sexually transmitted HPVs, including types 16, 18, 30 and 33, can lead to the development of cervical cell change (*dyskaryosis*), which in turn can lead to cancer of the cervix. The main risk factors are related to sexual behavior: early age at first intercourse, multiple sexual partners, early age at first pregnancy, multiparity,[11] and previous sexually transmitted infections. Additional risk factors include smoking and malnutrition. Since precancerous cells can be identified in a standard screening procedure, never being screened increases the risk of contracting cancer. The evolution from precancerous to cancerous cells can take many years, thus increasing the benefits from screening (Blumenthal and Gaffykin, 2005; World Health Organization, 2006). The most common screening procedure, the PAP smear test, has proved very successful in reducing cervical cancer mortality. Between 1950 and 1998 in the US there was a 79% reduction in the incidence of cervical cancer and a 75% decrease in mortality; there is unanimity among specialists that most of these improvements are due to the systematic PAP testing (e.g., Montz, 2001).

Following the example of developed countries, in 1974 the Mexican government launched its Cervical Cytology Screening Program (CCSP). This program has been constantly improved by the Mexican government, and includes measures that: i) allow all women to be screened free of charge regardless of their age; ii) require health professionals explicitly to offer screening to women in the 25-64 age group, with particular attention to those with high risk factors; iii) include written or verbal invitations for screening to all rural households with at least one woman aged 25 or over. Women who present normal cytologies for two consecutive years are invited to screen only every three years.[12] However, despite this program,

[11] There is no consensus about the causal explanation for this correlation. Some studies suggest that the physiological process in the last two trimesters of pregnancy modifies the host-immune response, others focus on the trauma to the cervix during delivery.

[12] This is the recommended screening frequency in the UK and US for women aged 25-49.

the adjusted mortality rate gap between Mexico and the other OECD countries continued to increase up to the late 1990s. It was not until the first decade of the 2000s that a significant reduction occurred and still mortality rates are high compared to the other OECD countries and also to other Latin American countries. According to the WHO, in 2002 the cervical cancer standardized mortality rate in Mexico was 14.1 per 100,000 inhabitants compared to 10.2 in Brazil and 7.8 in Argentina. In the same year mortality rates in the US and Canada were respectively 2.3 and 2.5 per 100,000 inhabitants. According to the Mexican Statistical Office, in 2007 cervical cancer mortality accounted for 12.1% of all deaths from cancers in the female population, with breast cancer accounting for 13.8% (the highest percentage).

While this high mortality might be due in part to the poor quality of health provisions,[13] a key determinant is low take up of screening. The 2000 National Health Survey (*ENSA*) reports that only 27.4% of the female population aged 20 or over had been screened for cervical cancer in the previous 12 months.[14] There has been a significant rise in the proportion of women who regularly screen. The 2006 National Health Survey, which also collects information on nutritional status, (*ENSANUT*), showed a large and significant increase in screening rates in Mexico with 36.1% of women aged 20 or over had submitted to a PAP test in the 12 months before the survey. Nevertheless, screening rates are still dramatically below the OECD country average, with 64% of the women aged 20-69 screened for cervical cancer in 2006.

There is a breast cancer screening program that targets Mexican women aged 40-69, but the uptake for regular screening is low. According to the National Health Survey, in 2000 only 12% of women in the target group had a mammogram in the 12 months before the interview. There has been an increase in recent years: in 2006 about 22% of women aged 40-69 reported being screened in the previous year. Although overall increased rates of screening for both cervical cancer and breast cancer are encouraging, the proportion of women who regularly screen for gender specific conditions is still low.

2.2 The *PROGRESA* program: features

PROGRESA is a cash-transfer, anti-poverty program that targets poor households. The average monthly grant up to November 1999 was 200 pesos per household, or 32.5 pesos per adult equivalent.[15] This is equivalent to about 23 percent and 16 percent of average food

[13] Flisser et al. (2002) find that inadequate supply of reagents and inadequate laboratory facilities increases the failure rate of the PAP test.

[14] According to the survey, 67.3% of the women who were screened were informed of the results and 9.3% of these were given a diagnosis of carcinoma or dysplasia.

[15] In the late 1990s 10 pesos was approximately US 1$.

consumption per adult equivalent for the poor and non-poor in the control villages (Angelucci and De Giorgi, 2009). Eligibility for the program is based on poverty level as defined by a measure of permanent income based on the information collected in the September 1997 census of villages. Two selection rounds were held: in 1997 52% of households were classified as poor and therefore eligible for the cash transfers. However, this allocation between eligible and ineligible households was revised before the program was rolled out and 54% of households initially classified as non-poor were reclassified as being in the eligible group. Most of these later classified individuals did not receive any grant during the first year of the program.[16] The program offers two benefits: it provides cash transfers to households conditional on their children's attendance at primary and secondary school. It also provides transfer and nutritional supplements conditional on regular health checks and attendance at health courses offered at local facilities.

Children under 24 months old and pregnant women are required to undertake screening throughout the year; lactating women and children aged 2-4 years are required to have two health checks per year; all individuals aged 17 or over must have an annual check up. The health center visits include advice on family planning, prenatal, childbirth and puerperal care, vaccinations, prevention and control of high blood pressure and diabetes mellitus, preventive treatment and screening for cervical cancer. In addition, beneficiaries are asked to attend health and nutrition classes (known as *platicas*). While classes are mainly aimed at mothers, any members of beneficiary households can attend. Non-beneficiaries in principle are allowed to attend educational classes. However, although there is some variation across villages, Adato et al. (2000) report that there is a consistent lack of participation in health and nutrition talks among those not entitled to the transfer. The classes cover various health and nutrition aspects with special emphasis on preventive health care.

Although *PROGRESA* is focused mainly on increasing demand for health services, it promotes actions to improve the supply of healthcare, including ensuring adequate supplies of equipment and medicines at health centers, and training of health professionals to improve the quality of medical care.

[16] They are usually referred to as *densificados*. A non-random subset of these households began receiving *PROGRESA* transfers in treatment villages before November 1999. Since no precise algorithm exists to determine which densificados in treatment villages received transfers, there is no counterfactual set of households in the control villages.

2.3 Data

The experimental data contain information on households from a sub-sample of 506 poor rural villages in seven states: 320 villages were randomly assigned to the treatment group and started receiving benefits in May 1998; 186 villages were randomized out and did not receive treatment until November 1999. The sample initially included 24,077 households. Households were informed that having been classified as either poor or non-poor, this status (and thus eligibility) would remain unchanged to November 1999 regardless of any income variation. Two features of *PROGRESA* are particularly interesting for my analysis. First, both poor and non-poor households were informed about their eligibility status and the conditionalities, mainly in village assemblies: take-up rates among eligibles were over 90%. Second, the women within the household were the recipients of the cash transfers. All residents in both control and treatment villages were interviewed at roughly six monthly intervals: twice before the program started (the October 1997 wave and the March 1998 tranche) and again in October 1998, May 1999 and November 1999.

Households fall into four groups of poor, and non-poor households, in treatment and control villages. Only the poor households in treatment villages were eligible for the *PROGRESA* transfer.

In the March 1998, October 1998 and May 1999 waves all household respondents (usually female) were asked whether any member of the household had been screened for: cervical cancer (via the PAP smear test), diabetes (blood sugar test) or hypertension (blood pressure testing). In the March 1998 wave respondents were asked whether any household member had been screened for these conditions in the previous 12 months; in the following two waves the question referred to the previous six months. Also, in March 1998 female respondents were asked about sex related behavior, including contraception, total number of pregnancies, whether they had ever had a PAP smear test, and also were presented with a set of questions designed to measure female emancipation.

PROGRESA also collects information on different aspects of health provision at both village and individual levels. The October 1997 and October 1998 locality questionnaires included detailed questions about the type of health infrastructures and services available in the village. The socio-economic questionnaires administered to the March 1998 and October 1998 waves asked for specific information on the main characteristics of health centers attended by any of the household members in the previous six months, including center opening times, cost of visits, waiting times to be seen, length of consultation and whether or not they had received medicines from the doctor.

Since one of my objectives is to study how the presence of a male partner shapes the effect of *PROGRESA* on the decision to screen for cervical cancer, I restricted my sample to male and widow headed households. After controlling for age, among widows the lack of a male partner is unlikely to be correlated with unobservable characteristics that can potentially affect the decision to screen for female specific conditions. This is not the case for women who have never married. I consider only households where the main female respondent, either the household head (in widow headed households) or the partner of the household head (in male headed households), is aged between 18 and 80.

In 2003, a new follow up round of data and a new control group, consisting of communities not yet covered by *PROGRESA* and chosen through propensity score matching, was included in the evaluation. The 2007 Rural Evaluation Survey (ENCEL) collected data on the original evaluation sample[17] and the 2003 control localities.

In 2007, the information on screening decisions is at individual level (which contrasts to the evaluation sample). All women in the household, aged less than 50, were asked whether they had been screened for cervical cancer. They were asked also about screening for breast cancer, hypertension, diabetes and cholesterol. The 2007 survey also included three modules particularly relevant for my purposes. There is a health center questionnaire directed to center administrators which includes an exhaustive set of questions on center characteristics, number and type of services offered, technical equipment, and numbers and working hours of doctors and nurses. A second module is a doctors questionnaire to collect information on socio-demographic characteristics, specializations, training and current practices. It asks specifically about the frequency of advice on and performance of gender specific screenings, i.e. PAP smear test and mammogram. Finally, there is a module addressed to young people in the age group 14-24 that includes questions designed to assess their knowledge of health risk factors, including sex related conditions.

In the matched sample of localities from the evaluation sample and the control group in 2003, 98 localities have at least one permanent health center, and 69 localities with at least one doctor who provides regular service.

[17]Communities with very small populations (less than 20 households) were not resurveyed in 2007

3 Descriptive Analysis

3.1 Sociodemographic characteristics by gender of the head of household

Table 1 shows the means and the standard deviations of socioeconomic variables measured mostly at the baseline, October 1997. Columns (1) and (2) in Table 1 present characteristics separately for the sample of male headed households and widow headed households. Column (3) reports the p-values of the differences between the two groups, allowing for within-village clustering.

As expected, male and widow headed households are systematically different along many dimensions. The household head and his partner in the sample of male headed households on average are much younger than the widows. Age is positively associated with the risk of chronic conditions such as diabetes and high blood pressure, but also cervical cancer, as shown by the age profile of cervical cancer incidence for Mexico shown in Figure 1. Widows are significantly less likely to be literate than either the male or the female partner in the group of male headed households.

Different measures of income and wealth suggest that widow headed households are relatively better off than male headed ones in terms of resources. The average monthly income per adult equivalent in the group of widow headed household is 414 pesos on average, compared to 328 pesos for male headed ones. The wealth index, on which eligibility for the program is based, is 767.4 for widowed households and 728.7 for male headed households, with a difference that is statistically significant at the 1% level. As result, the fraction of households eligible for *PROGRESA* is significantly higher among male headed households (55%) than among widow headed ones (40%). Evidence on household composition suggests that those headed by males are larger in size (number of household members) and include a higher number of cohabitating children than female headed households. Only 4.5% of the male headed sample is covered by the *IMSS* insurance, and the percentage is even lower for households headed by widows, 1%.[18] The proportion of women in the household who completed secondary schooling is significantly higher in male headed than female headed households. Previous studies (Palacio-Mejía et al., 2003; Leyva et al., 2006) find for Mexico

[18] Participation is compulsory for workers employed in the formal sector, and voluntary for self-employed people. Public employees are covered by the Institute of Social Security for Public Employees (*ISSSTE*) but they represent a negligible fraction of the *PROGRESA* sample. At national level, *IMSS* and *ISSSTE* clinics make up approximately 33% of all hospitals and 12% of the ambulatory care facilities.

that lack of formal education is strongly correlated with lack of compliance with cervical cancer screening.

If I compare assets and livestock ownership, I find that endowment in male headed households is systematically higher than in female headed ones.

In the evaluation sample, information on screening is available only at household level. Thus, I cannot relate screening outcomes to individual measures of health risk. However, I can compare how some risk factors vary for female respondents living in male and female headed households. In particular, since the March 1998 survey asks female respondents for information on present and past sexual activity, I can construct proxies for some of the risk factors associated with cervical cancer. Female respondents living in widow headed household have a higher number of pregnancies during their life. Women in the group of male headed households are younger and less likely to have reached the end of their fertility, but there may also be cohort differences in use of contraception. For instance, 62% of widows stated they had never used contraception compared to 56% of women living with a partner. All together, the evidence presented in Table 1 would suggest that the average risk of contracting cervical cancer is substantial for women in both widow headed and male headed households. A very high percentage of female respondents stated that they never screened for cervical cancer, but the fraction is significantly higher among women living with male partners: 62% versus 59%.

The *PROGRESA* dataset also contains measures of female emancipation. Before the program was implemented (March 1998) all female respondents were asked about women's status. In particular, they were asked if they agreed or disagreed with the following statements: i) a woman's place is in the house; ii) women have to obey men; iii) women have their say in community issues; iv) women should have a job outside the house; v) women should have same rights as men; vi) women should have their own opinions. I converted the answers to these questions into dummy variables and derived a Female Status (FS) index ranging between 0 and 6, where 6 represents the lowest degree of female emancipation. The differences in the average FS scores suggest that women living with male partners are less emancipated than widows, with a difference that is statistically significant at 1% level. A Pearson chi square test strongly rejects the hypothesis that the two samples are drawn from the same distribution, and results are similar if I consider each of the answers separately. Although widows belong to older age cohorts and might, in principle, have been exposed to stronger cultural norms related to female status, the lower level of emancipation displayed by women who live with partners suggests that the physical presence of a partner might *per se* affect women's perceptions of their status and level of independence.

Because I later exploit the random assignment of *PROGRESA* separately for male and widow headed households, in columns (4) and (5) I report the p-values of the differences in observables between the treatment and control villages separately for male headed and widow headed households. Given the randomization, most of the variables do not have statistically different means for the control and treatment villages at the 95% confidence level. Indeed, out of 31(29) tests of mean equality reported for male(widow) headed households, only 1 test (less than 5% of the total) has a p-value lower than 0.05. The only variable where households in the treatment and control localities differ is the proportion of households that has a television in the home. Although this variable is unlikely to have an effect on the propensity to undergo medical screening, the empirical specification includes a dummy for owning a television, as measured in the baseline survey.

3.2 Health Supply

One of the distinctive criteria for a village to be included in the *PROGRESA* evaluation sample was the presence of basic health services. The upper panel in Table 2 provides evidence of health providers' coverage in the *PROGRESA* villages and how the composition between treatment and control villages varies over time. In Mexico there are two main public providers for households not covered by insurance: Health Secretary (*SSA*) and *IMSS Solidaridad*. In October 1997, 13% of the control villages had *SSA* clinics, compared to 8% of treatment villages with a difference significant at 10%. By October 1998 the proportion of villages with at least one *SSA* hospital does not differ significantly between treatment and control villages. No significant changes are observed in the fraction of villages covered by *IMSS Solidaridad* clinics.[19]

The presence of *IMSS* hospitals is fairly small in the *PROGRESA* villages and does not vary significantly between treatment and control villages at either the baseline or October 1998. The auxiliary health units are usually in rather inaccessible rural locations, with populations of between 500 and 1,000 inhabitants. They can usually rely on the presence of one general practitioner. The mobile health units are staffed by medical practitioners and paramedics who offer a full set of outpatient services. Auxiliary health units and mobile units are the most common providers in *PROGRESA* villages. At the baseline there is a bigger proportion of villages with at least one auxiliary health unit in the control group; in

[19] At national level 42% of all Mexican hospitals are run by *SSA*. IMSS Solidaridad is a program launched by the Mexican Government in cooperation with the Mexican Institute of Social Security (*IMSS*) to reach rural populations in marginal areas. In July 2000 the program was renamed IMSS Oportunidades.

October 1998 coverage does not differ significantly between treatment and control villages. The proportion of villages served by mobile units in October 1997 is higher in the treatment than the control group, but becomes not statistically different once the *PROGRESA* program is in place. While *SSA* and *IMSS Solidaridad* hospitals are bigger on average, and better equipped than health aid centers and mobile units, all offer basic screening services. The average number of health services available in the village[20] increases sharply in October 1998, but does not differ significantly between the treatment and control villages.

In the lower panel of Table 2 I consider the village averages of individual responses and provide evidence on average waiting times to be seen, opening times of centers, average duration of consultations and consultation fees. Baseline differences between treatment and control villages are not significant, except for duration of consultations, which is slightly longer in non-treatment than in treatment villages. *PROGRESA* does not result in significant changes in waiting times, opening times or visit duration.

While cervical cancer screening is free of charge for both eligibles and ineligibles under the CCSP, women can decide to have the screening done as part of a more general medical consultation. In this case the fee charged by the doctor for the visit represents the real cost of the screening. For the October 1998 wave the average consultation fee for treatment and control villages dropped dramatically, but the reduction is significantly bigger for the treatment villages. This is due to the eligibles accessing health centers free of charge as part of the program conditionalities. The results presented in this section suggest that health services were strengthened equally in treatment and control villages, producing an increase in the number of services available and a reduction in prices for both groups. Improvements in health facilities in the control villages might have been carried out ahead of the program implementation at the end of 1999.

3.3 Screening Behavior

This section provides descriptive evidence on pre-program screening levels and the variation over time, by poverty status, for the treatment and control villages.

In order to compare during the program and pre-program screening levels, I calculate the cumulative probability that any household member is screened either in the six months before October 1998 or in the six months before May 1999. This measure can be compared directly with the March 1998 information. Consistent with the differences in poverty status, baseline screening rates are systematically higher among non-poor than poor households.

[20] Based on the 7 services listed in the locality questionnaire: prenatal care, delivery care, infant care, vaccination, diarrhoea treatment, family planning, hospitalization.

While pre-program screening rates for high blood pressure and blood sugar show small and insignificant differences between treatment and control villages for both poor and non-poor households, at March 1998 control localities display higher PAP test coverage, especially for non-poor households. Reassuringly, none of the baseline differences in screening rates between treatment and control localities is statistically significant (see Table 3).[21] Screening rates show a sharply increasing trend over time for eligibles and ineligibles in both the treatment and control villages. This result is consistent with the already discussed increase in health supply coverage for treatment and control villages. In order to measure how screening rates change after program implementation, I estimate an unconditional Differences in Differences (DD) linear model, with standard errors clustered at village level. As expected, screening rates for eligibles show a remarkable increase for all the tests (on average above 20 percentage points). Among ineligibles, blood pressure and blood sugar screening rates do not change significantly between the treatment and control groups. In contrast, the DD response for cervical cancer screening is strong and significantly different from zero: there is a 5.3 percentage point increase in the PAP test take up rate for non-poor households in treatment villages (see Table 3). This has to be interpreted as the overall effect of *PROGRESA* on cervical cancer screening among non-poor, since it accounts for both potential demand and supply changes induced by the program.

4 The Indirect Effect on Screening

4.1 Model of screening demand and supply

Here, I propose a simple framework to identify how *PROGRESA* affects demand for screening from non-poor households. The model draws on work that relates waiting times to service demand and supply (Lindsay and Feigenbaum, 1984; Gravelle, 1990; Blundell and Windmeijer, 2000). In this framework village average waiting time acts as the price of the health services for households in the community. There are two main reasons why I choose waiting time rather than a more standard monetary price. First, because of the CCSP, cervical cancer screening is free of charge for women irrespective of the treatment status of the village and the health provider. Second, the locality average consultation fee would not represent the true cost sustained by households not eligible for the transfer in treatment

[21] In the group of non-poor the screening rates for *densificados* households in March 1998 are lower than those for households whose eligibility status was not revised. The average screening rate for cervical cancer among *densificados* is 30.9% compared to 40.9% for *non-densificados*. I also observe smaller but statistically significant differences for hypertension and diabetes screening.

villages, since the eligible ones access health facilities for free as part of the program conditionalities.

Each individual will be assumed to undertake screening at any point in time if it yields a greater expected utility than non-screening, where the uncertainty is due to the probabilistic nature of the disease being screened.[22] For each member of household i the net benefit of screening is assumed to be positively correlated to the expected payoff of the test, and negatively correlated to the average waiting time to access health services in the village of household i, W_i. Since the data only provide information on whether at least one household member was screened, I model the demand for screening at the household level. Let q_i be a binary variable that takes the value 1 if at least one member of household i is screened, and 0 otherwise.

Formally, in the village where household i lives there are N_i^{NP} non-poor households and $N_i^P \equiv N_i - N_i^{NP}$ poor households. The reduced form demand equation for screening of non-poor household i can be written as:

$$q_i^{NP} = 1(X_i, T_i, W_i, v_i) \tag{1}$$

where $1(\cdot)$ is an indicator function. X_i is a set of socio-demographic characteristics of household i, T_i takes the value 1 if household i belongs to a village covered by *PROGRESA*, and 0 otherwise; W_i is the locality average waiting time before being seen by a doctor. v_i represents the unobserved characteristics correlated with the decision to screen. The aggregate demand for preventive screening is given by:

$$D_i = \sum_{i=1}^{N_i^{NP}} q_i^{NP} + \sum_{k=1}^{N_i - N_i^{NP}} q_k^P \tag{2}$$

where D_i represents the proportion of both poor and non-poor households that demand screening in the locality where household i lives and is negatively correlated to W_i. I assume that in each period the supply of health facilities in the village where household i lives, S_i is given and is inelastic with respect to W_i. The market for screening services is in equilibrium if the observed waiting time, W_i, is equal to the waiting time W_i^* at which demand and supply of screening intersect:

$$D_i = S_i \Leftrightarrow W_i = W_i^* \tag{3}$$

[22]Another potential source of uncertainty that I do not consider in this work is related to the effectiveness of the treatment once the disease has been diagnosed (e.g., Picone et al., 2004).

While I want to test whether the program affects the demand for screening from ineligible households, q^{NP}, equations (2) and (3) show that there are two additional mechanisms through which *PROGRESA* might affect the screening rate of non-poor households. First, health supply in the locality of household i, S_i, might improve, benefiting both eligible and ineligible households. Second, in order to comply with the conditionalities, poor households might increase their demand for medical screening and crowd out demand from those not entitled to the transfer. The underlying assumption of the model is that these two mechanisms affect q_i^{NP} through the waiting time, W_i.

In order to estimate the effect of *PROGRESA* on the demand for screening I estimate the following equation using a linear model:[23]

$$Y_{it} = \gamma_0 + \gamma_1 P_i + \gamma_2 T_t + \gamma_3 P_i * T_t + \beta' X_i + \delta_1 W_{it} + \delta_2' H_{it} + u_{it} \tag{4}$$

Y_{it} denotes the health screening decision of household i at time t. P_i takes the value 1 if household i lives in a locality covered by *PROGRESA*, and 0 otherwise. T_t takes the value 1 for the survey after the program's implementation, 0 for those before. X_i includes gender, age (expressed in dummies), and literacy of the household head, and a dummy for whether (s)he speaks the indigenous language, household poverty index, household size, number of children, whether the household is covered by an *IMSS* insurance, whether the household includes women in the age group 20-64, and proportion of women over 18 with a secondary school degree. I control for household assets by including dummies for whether the household owns a television, a radio or land. I control also for the average poverty index for the locality and state fixed effects. All these controls are measured at the baseline. Although controlling for baseline sociodemographic characteristics likely increases the precision of the estimates, it does not affect the estimation of my parameter of interest.

The specification also controls for the average waiting time in the locality of household i at time t, W_{it}, and a vector of the dummy variables that control for type of providers in the village at time t, H_{it}. These variables are measured both before and after implementation of *PROGRESA*. The model in equation (4) assumes that both the supply and crowding out effects induced by the program are captured by changes in waiting times and the composition of health providers. In the estimation standard errors are clustered at village level, the level at which *PROGRESA* operates, in order to capture common shocks that might have affected household screening behavior within the village.

If I consider the sample of non-poor households, the parameter γ_3 identifies the indirect

[23]Results based on probit models, not reported here, are perfectly in line with the reported results.

treatment effect (ITE) of *PROGRESA* on the demand for screening. If I estimate equation (4) on the sample of poor households, γ_3 identifies the average treatment effect (ATE). These are the two parameters of interest for my analysis. By using a DD strategy, I control for the possibility that there are pre-program differences in the prevalence of a certain disease and/or the possibility to screen for it,[24] which I cannot control for. It should be underlined that, while W_{it} and H_{it} might be potentially endogenous, the parameters δ_1 and δ_2 are of no interest for my analysis.

Three basic assumptions are needed to identify the effect of *PROGRESA* on the demand for screening of non-poor and poor households. First, I assume there are no spillover effects from treatment to control villages, so that the demand for medical screening is driven by whether they live in a treatment village or not, and not by the statuses of other villages. Second, I assume a random assignment of villages into treatment and control groups. This is equivalent to assuming that whether a household is in a treatment or a control village is independent of unobservables that might affect the demand for health services. These two assumptions of no cross village spillovers and random assignment are standard requirements for identifying ITE and ATE (Angelucci and De Giorgi, 2009; Angelucci et al., 2010a). They are equivalent to assuming that non-poor(poor) households in control villages provide a valid counterfactual for non-poor(poor) households in treatment villages in terms of health service utilization. To provide support for the first assumption I note that villages were included in the evaluation data because they were geographically distant. With respect to the second assumption, it has been documented already (Schultz, 2004; Berhman and Todd, 1999) that household and village characteristics do not significantly differ across treatment and control villages, which is consistent with the random assignment. Third, I assume that changes in health supply and crowding out driven by *PROGRESA* can affect the propensity to screen only in terms of waiting time and health provider composition. While this assumption might seem overly strong, it is supported by the evidence provided in the next section.

4.2 Baseline Results

I first estimate the ITE of *PROGRESA*, as described in equation (4), for three different outcomes: testing for cervical cancer, testing for diabetes and testing for hypertension. The results presented in column (1) in the top panel in Table 4 show that, once I account for waiting time and provider composition, *PROGRESA* led to a 4.6 percentage point increase in the propensity to screen for cervical cancer among women living in non-poor households.

[24] This might be related to the distance from a bigger hospital where screening tests may be more accurate and faster.

Comparing this effect with the overall increase due to the program, shown in Table 3, suggests that the variation in health supply plays a fairly limited role in explaining the indirect effect of the program on cervical cancer screening. The results in columns (2) and (3) in the top panel in Table 4 show that there is a small and not statistically significant effect of *PROGRESA* on the demand for blood pressure and blood sugar screening among non-poor households. The bottom panel in Table 4 shows the results for eligible households: there is a significant increase of over 20 percentage points in the probability of undertaking all screening tests, irrespective of whether or not they are gender specific.

Since my main objective is to understand how the indirect effect on demand for cervical cancer screening is related to its gender specific nature and lack of information, I need to explore a variety of alternative mechanisms.

First, because of the income spillover from poor to non-poor households documented in previous work (Angelucci and De Giorgi, 2009; Angelucci et al., 2010b), the program might have shifted upward demand for health services from non-poor households. In other words, women are being screened for cervical cancer more often just as a result of the higher propensity to use health services among ineligibles. While the lack of a significant effect on non-gender specific screening outcomes seems to exclude this explanation, I can test whether the program increases access to clinics and health related expenditure. The results in columns (1) to (3) in Table 5 report results for three different outcomes: probability of accessing a health center for a visit in the last 6 months; expenditure on doctor consultations; expenditure on medicines. The upper panel of the table presents the results for the non-poor. My results do not show any significant evidence of ITE on the probability of accessing a health center to see a doctor. While this result might seem to be inconsistent with an increased cervical cancer screening rate, it is consistent with a change in the demand for female specific screening. The CCSP program guidelines require health professionals in all Mexican localities to invite women aged 25-64 for regular cervical cancer screening, but the evidence in Adato et al. (2000) suggests that women frequently refuse to be tested. I also found no indirect effect on health related expenditure (see top panel in Table 5, columns (2) and (3)). This finding is consistent with the results in Angelucci and De Giorgi (2009), which finds no indirect effect on the consumption of durable goods.

The bottom panel in Table 5 reports the results for the group of poor households. As expected, members of poor households are significantly more likely (16 percentage point increase) to have accessed a clinic in the previous 6 months to visit the doctor. For this group there is respectively reduced expenditure on doctor consultations and medicines (columns (2) and (3)). This might be related to the fact that poor households receive medicines and treatment as part of the conditionalities for receiving the transfer. These results suggest overall that the significant response of the non-poor group for cervical cancer screening is not based on a generally increased demand for health services.

I have accounted for the possibility that *PROGRESA* affects the supply of health services by increasing health care provision, but this is a restrictive assumption. For example, *PROGRESA* might have improved the "quality" of the health care in treatment villages. In particular, since the program is targeted mainly at pregnant and lactating women, doctors working in treatment villages may have more in-depth knowledge about female specific conditions, gained through attendance at training courses or adherence to specific guidelines. This could explain the significant indirect effect on screening for cervical cancer screening but not for other conditions. In order to investigate this, I test the effect of the program on two prenatal care outcomes: number of checks during pregnancy, and vaccination against tetanus during pregnancy. The underlying rationale is straightforward: if the program has improved the ability of doctors to deal with female specific issues, I should observe a change in pregnancy related outcomes. The results presented in columns (4) and (5) in Table 5 display a negative and insignificant indirect effect of the program on pregnancy related outcomes compared, to a positive, but not significant, effect for eligibles. Another potential issue related to the quality of health providers might be related to substitution of public care by private care. Consistent with Gertler (2000), I found no evidence of a change between health care provider among non-poor households.

The evidence so far does not support the hypothesis that the increase in the propensity to screen for cervical cancer is driven by improvements in the health supply. However, the information from the evaluation sample does not allow us to test directly whether cervical cancer screening facilities are better in *PROGRESA* localities. In order to provide some additional evidence about the role of health care provision, I exploit information from the first wave of the Mexican Family Life Survey (MxFLS) to assess whether cervical cancer screening facilities are systematically better in *PROGRESA* localities. The MxFLS is a rich, longitudinal database and assesses, among other objectives, the medium and long run impact of the *PROGRESA* program. It includes a household survey, and a large community survey based on interviews with public and private schools, health providers, small health practitioners, community leaders were interviewed. Data from the first wave, completed in August 2002, allow us to study how (before the nationwide extension of the program) health facilities in *PROGRESA* program localities differed from those in other areas. I restrict the MxFLS sample to localities with up to 2,500 inhabitants in order to improve comparability with the *PROGRESA* evaluation sample. The final sample includes 52 localities (39 of which were covered by *PROGRESA*) for which I have administrative information on at least one health center. In 79.5% of the localities covered by *PROGRESA* there is the opportunity to screen for cervical cancer compared to 76.9% in localities where the program is not in place. According to managers of health facilities, in 87%(100%) of the localities with(without) *PROGRESA* there have been no problems with equipment and materials required for PAP tests. None of these differences is statistically significant at the conventional levels. None of the sample localities (*PROGRESA* or not) had a laboratory for analyzing the PAP smear tests. It is not clear how far localities in the MxFLS sample are comparable with those in the *PROGRESA* evaluation sample and I can interpret these findings only in terms of providing additional evidence that changes in health supply play a fairly limited role in explaining the indirect effect of *PROGRESA* on cervical cancer screening.

To summarize, the evidence presented so far shows that the magnitude of the indirect effect of *PROGRESA* on demand for cervical cancer screening from ineligible households is non-trivial and statistically significant. My findings do not support the hypothesis that the behavioral response of non-poor households in terms of screening for a female specific condition is due to changes in either the "quantity" or the "quality" of supply. Unlike previous studies on the indirect effect of *PROGRESA*, I find no evidence that income spillovers from eligible to ineligible households produced a change in the propensity to undertake medical screening. In the next section I investigate how this effect is related to the gender specific nature of the test.

5 Mechanisms

5.1 Social Norm

Evidence from epidemiological research (see Lazcano-Ponce, 1997; Watkins et al., 2002) shows that male opposition to wives being checked, and concerns about physical privacy are two of the main reasons why women do not go for screening. Adato et al. (2000), in their study of the operational performance of *PROGRESA*, report that when doctors were asked about difficulties related to the program's health component they frequently referred to problems encountered by male doctors in dispensing family planning advice to women and preventive PAP smear testing. Most doctors agree that PAP smear testing was problematic because many men were opposed to their wives having the test, and especially if screening was by a male doctor.

This evidence suggests that the individual decision to seek screening for cervical cancer might be socially regulated. In the next section I propose a simple model of social norm diffusion that shows how *PROGRESA* might have increased the social acceptability of the PAP smear test; in Section 5.1.2 I test the empirical implications of the model exploiting the randomized assignment of the program and heterogeneity in the strength of the social norm between male headed households and households headed by widows. The evaluation sample survey does not report doctor's gender; however, this information is available from the 2007 survey data. In Section 6 I test directly the extent to which the effect of exposure to *PROGRESA* on the propensity to screen for female specific conditions is related to the presence of male doctors.

5.1.1 Model of Social Norm Diffusion

In this section I outline a simple framework that describes how the introduction of *PROGRESA* in the presence of an established social norm might have affected screening behavior. My characterization of social norm is close to those proposed by Kandori (1992) and Munshi and Myaux (2006) although I do not try to characterize the long run equilibrium. My overall aim is to assess whether the indirect effect of *PROGRESA* on cervical cancer screening, documented above, can be explained in terms of its weakening effect on the social norm. The model is designed to generate transparent and testable predictions.

Consider a village consisting of a continuum of women. A woman can choose between two actions: screening for a gender specific condition (s) and not screening (ns). When screening behavior is socially regulated, the payoff depends on both the intrinsic utility the individual woman derives from screening and also on the social pressures or sanctions that accompany it. The individual's payoff depends on her individual action, and on the action of a peer. I can assume, without loss of generality, that in each period each woman can only be matched with one other woman in the village.

Formally, I model the payoff from screening, before implementation of *PROGRESA*, as follows:

$$V_i^k(s,s) = w^k \tag{5}$$

$$V_i^k(s,ns) = w^k - l_i \tag{6}$$

$$V_i^k(ns,ns) = 0 \tag{7}$$

$$V_i^k(ns,s) = 0 \tag{8}$$

where k denotes the household's poverty status and is equal to P for poor (eligible for the transfer) households and NP for non-poor (ineligible) households. V_i^k is the payoff for a woman i living in a household with the poverty status k, where the first term in parentheses refers to the woman's own action and the second term refers to the action of her peer. I allow for the possibility that the payoff from screening is different for poor and non-poor households. Table 3 shows that, at the baseline, cervical cancer screening rates are higher for women living in non-poor households than for those in poor households. Later in this section I provide evidence that is consistent with the hypothesis that women living in non-poor households have a higher opportunity cost from contracting the disease.

l_i, that varies across women, is the cost of the social norm for woman i and proxies for either husband's reaction or the woman's fear of his reaction. The underlying intuition is that husbands will punish their wives if their behavior does not conform to the behavior of most of the wives in the community. l_i is assumed to be normally distributed with $l_i \sim N(\bar{l}, \sigma^2)$. I assume that the expected loss of utility from the decision not to screen is equal to 0, independent of peer action.[25]

In each village there is a fraction Π of women who undergo screening for cervical cancer, where Π is given by:

$$\Pi = \mu\pi^P + (1-\mu)\pi^{NP} \tag{9}$$

μ is the fraction of poor households in the village, π^P is the average screening probability for women living in poor households; π^{NP} is the average screening probability for women living in non-poor households. Every woman will opt for screening if

$$\Pi w^k + (1-\Pi)(w^k - l_i) \geq 0 \tag{10}$$

Women base their decision to screen or not on the overall probability of meeting other women who screen, irrespective of their poverty status.

As *PROGRESA* provides women in poor households with a financial incentive to screen for cervical cancer, the expected payoff for poor women increases by an amount τ, but does not change for women in non-poor households. In equilibrium, among poor households only women with $l_i \leq l^{P*}$ screen, where l^{P*} is given by:

$$l^{P*} = \frac{w^P + \tau}{(1-\Pi^*)} \tag{11}$$

[25] Alternatively, I could assume that there is a social reward for a woman who decides not to screen and who is matched with a woman who does have the test (Luke and Munshi, 2007). My main conclusions would not change.

For women living in non-poor households, only women with $l_i \leq l^{NP*}$ will screen, where l^{NP*} is given by:

$$l^{NP*} = \frac{w^{NP}}{(1 - \Pi^*)} \tag{12}$$

Π^* represents the overall fraction of women who screen in equilibrium and it is given by

$$\Pi^* = \mu \int_{-\infty}^{\frac{w^P + \tau}{(1-\Pi^*)}} \phi(l)dl + (1 - \mu) \int_{-\infty}^{\frac{w^{NP}}{(1-\Pi^*)}} \phi(l)dl \tag{13}$$

Using equations (11), (12), (13) and the implicit function theorem, I can derive how the equilibrium screening rates of both poor and non-poor households change in response to the cash transfer:

$$\frac{\partial l^{P*}}{\partial \tau} = \frac{1}{(1 - \Pi^*)} + \frac{w^P + \tau}{(1 - \Pi^*)^2} \frac{\Delta \Pi^*}{\Delta \tau} \tag{14}$$

$$\frac{\partial l^{NP*}}{\partial \tau} = \frac{w^{NP}}{(1 - \Pi^*)^2} \frac{\Delta \Pi^*}{\Delta \tau} \tag{15}$$

The function $h(\cdot) \equiv \frac{\Delta \Pi^*}{\Delta \tau}$ has the following properties:

1. $\dfrac{\partial h}{\partial \mu} > 0$;

2. $\dfrac{\partial^2 h}{\partial \mu \partial \bar{l}} > 0$

Munshi and Myaux (2006) model social norm diffusion as a learning process over time where people gradually update their priors. In my case, although women from treatment villages have no information about pre-program screening rates in their villages, they can make inferences about changes as result of the program. Between October 1997 and August 1998, *PROGRESA* convened public meetings where the eligibility and conditionalities applying to each household were spelt out.[26] Therefore, given the small size of the villages, it is reasonable to assume that all the women in the treatment villages were informed about who was required to undergo PAP testing as part of the conditionalities of the cash transfer.

The model has three testable predictions:

1 For socially regulated screening tests, both the effect for the non-poor (as measured

[26] After the program started, a community outreach worker, the *promotora*, chosen from among the eligibles, was responsible for providing information on the program for its duration. Although the promotora was meant to be contacting mainly beneficiaries, Adato et al. (2000) reports frequent interactions with non-beneficiaries.

by the ITE) and for the poor (as measured by the ATE) should increase significantly with the fraction of eligible households in the locality;

2 The size of the interaction between the treatment effects of the program, both ITE and ATE, with the fraction of eligible households in the locality should be bigger for those groups of women whose cost of violating the social norm is higher;

3 For non-socially regulated screening tests neither the direct or the indirect effect should vary with the fraction of eligible households.

The model shows also that the size of the interaction between the ITE and the proportion of eligible households depends on the parameter w^{NP}, while the size of the interaction between the ATE and the same proportion depends on w^{P} and τ. It is hard to quantify exactly the difference between the expected payoff from screening for women living in poor households, compared to those in non-poor ones. The baseline survey, for the sample of non-poor households, shows that 16.1% of female respondents reported having a job outside the household in the week before the interview, which should be compared to 8.9% of female respondents from poor households. Among those who reported income, the average was 797 pesos for non-poor women and 612 pesos for those living in poor households.[27] This evidence suggests that the opportunity cost of not screening and suffering from cervical cancer might be potentially higher for non-poor than poor women. It is also difficult to quantify the part of the transfer tied to cervical cancer screening (in my model τ). Bobonis (2009) reports that the health and nutrition component provides cash transfers for approximately 12 pesos per month, and nutrition supplements targeted at infants aged 4-24 months, pregnant and breast-feeding women, and children aged 2-5 years exhibiting signs of malnutrition. Therefore, I cannot rule out the possibility that $w^{NP} \succeq w^{P} + \tau$. In other words, the theoretical model, in principle, would allow for the size of the interaction between the ATE and the fraction of poor households in the locality to be bigger than the interaction between the ITE and the same fraction.

5.1.2 Empirical Evidence on the Social Norm Mechanism

The above model shows that *PROGRESA* increased the social acceptability of cervical cancer screening. The requirement to screen as a condition for receiving the cash transfer determined an overall increase in the fraction of individuals undertaking screening. This

[27] Both the probability of working and income differences are statistically significant at the 1% level.

meant that women who decide to screen for cervical cancer, irrespective of eligibility or not for the transfer, are less likely to perceive their behavior as deviating from the norm.

In order to investigate the model's predictions, I exploit heterogeneity in the strength of the social norm between male and widow headed households. Male partners potentially could be censorious (or might be perceived as such) about the decision of women in their household to screen for cervical cancer, and especially if they knew that the test would be performed by a male doctor. This does not apply to widows. Formally, I estimate the following model:

$$Y_{it} = \gamma_0+\gamma_1 P_i+\gamma_2 T_t+\gamma_3 P_i*T_t+\gamma_4 FP_i+\gamma_5 P_i*FP_i+\gamma_6 P_i*T_t*FP_i+\beta' X_i+\delta_1 W_{it}+\delta_2' H_{it}+v_{it} \tag{16}$$

where FP_i denotes the fraction of poor households in the locality where household i lives. In *PROGRESA* localities the fraction of poor households represents the proportion of households required to comply with the conditionalities in order to receive the transfer. The main parameter of interest is γ_6. When I estimate equation (16) for the sample of non-poor(poor) households, γ_6 captures how the ITE(ATE) varies as the fraction of poor households in the locality increases. For both non-poor and poor households, I estimate the model separately for male headed and widow headed households. The term P_i*FP_i accounts for possible anticipation effects. Because of the extensive information campaign implemented by the program organizers, non-poor households might anticipate that, in localities with a higher fraction of eligible households there would be a higher demand for health services once the program was in place, and decide to screen before its start. This is relevant in my case since information on baseline screening rates comes from the March 1998 survey, and the population started receiving information in October 1997.

The top(bottom) panel in Table 6 reports the results for the non-poor(poor) households: the odd numbered columns report the result for male headed households; the even numbered columns report the results for widow headed households. I start by considering the propensity to screen for the female specific condition of cervical cancer. If I interact ITE with the fraction of eligibles, the coefficient is positive and statistically significant only for the sample of male headed households, and is negative and not statistically different from zero for the sample of widow headed households (see columns (1) and (2), top panel in Table 6). The results for the poor households (see bottom panel of Table 6) make clear the two mechanisms through which the program affects the propensity to undertake a socially regulated screening test. The ATE, not interacted, provides the direct effect of the conditionality:

poor households screen more in order to receive the transfer. The effect is statistically different from zero for both male and widow headed households. The positive and significant interaction between the ATE and the fraction of eligibles for the subsample of male headed households, as opposed to the negative and not statistically significant interaction for the sample of widow headed households, supports the prediction that the effect is stronger for the group of women whose behavior is more likely to be censored.[28]

The size of the interaction between the ATE and the fraction of poor households is bigger than the size of the interaction between the ITE and the same fraction, although the difference is not statically significant. As mentioned above, this result is potentially consistent with my modeling of social norm diffusion.

In order to test the third prediction, I estimate the model in equation (16) for non-gender specific screening tests. I find that the effect of the program does not vary significantly with the fraction of poor households in the locality for either blood pressure or blood sugar testing, irrespective of whether I consider the indirect treatment (top panel) or the average treatment (bottom panel) effect.

I check the robustness of my results through several tests. In order to account for the possibility that the differential responses of male and widow headed households are due to the age differences of women in these groups, I estimate two alternative specifications: in the first one I control for the age of the female respondent in single year age dummies, in the second I restrict the sample to those households where the head of household is 65 or younger. In both cases, the results (not reported here) were perfectly in line with the results presented. The interaction between treatment effects and the fraction of eligibles might potentially be explained by the fact that the response to the program varies with respect to poverty. I therefore ran an alternative specification that includes also the square and the cube of the individual poverty score and the square and the cube of the locality average poverty score. Again, the results were in line with those discussed above. In summary, the empirical evidence presented in this section supports all the predictions of the social norm diffusion model.

5.2 Social Learning

There is an alternative mechanism through which *PROGRESA* might affect the screening decision of non-poor households, that is, social learning. Women who take the PAP test could

[28] For neither poor nor non-poor households is the difference between the interaction term for male and widow headed households statistically significant at conventional levels. This arguably is related to the small size of the widow headed sample.

share information with other women about different aspects of cervical cancer screening: risk factors, the existence of the PAP technology, and their experience of the test. Women might learn from those who screen either through word of mouth or by observing their actions (observational learning). Similarly, both men and women could potentially learn about the screening of non-gender specific conditions, such as hypertension and diabetes. A higher fraction of people in the locality who screen, driven by compliance with the *PROGRESA* conditionalities, would increase the opportunity for social learning. Therefore, a significant interaction between the ITE(ATE) and the fraction of poor households in the locality in principle would be consistent with the presence of social learning. However, this is not the only empirical implication of the social learning mechanism.

The appendix presents a simple normal learning model, that closely follows Moretti (2011), to describe how social learning affects the screening decisions of poor and non-poor households in *PROGRESA* localities. Here I provide the intuition and the main implications of the model.

Individuals have imperfect knowledge about the risk of contracting a specific health condition. Before the implementation of *PROGRESA*, individuals living in poor and non-poor households have a *prior* on the probability of contracting a disease; i.e., the utility from screening for it. This prior is updated through direct sharing of information with peers or observation of their screening behavior. Using the terminology in the social learning literature (Ellison and Fudenberg, 1995), the information received by others represents a *signal*. In my context, social learning is the process by which individuals use the direct or indirect information received from peers to update their own expectations of the utility from screening. In the presence of social learning, an individual's expectation of screening utility is the weighted average of the prior and the signal received from her peers, where the weights reflect the relative precision of prior and signal. In order to keep the model simple, I assume that before the introduction of *PROGRESA* there were no other sources of learning, such as learning by doing.[29] In my setting, additional mechanisms for acquiring information would not affect the predictions that I test empirically.

PROGRESA has two effects. First, since more individuals are screening in order to comply with the conditionalities of the program, the precision of the signal from peers' feedback is improved. In my framework, this improved precision affects individuals living in poor and non-poor households equally. Second, poor households receive an additional signal of the expected utility of screening tests, obtained through compulsory attendance at health and nutrition courses. Therefore, the expected utility from screening for poor

[29] Individuals who had screened in the past have better knowledge of the risk factors.

households is now a weighted average of the prior, the peer feedback and the information received in classes. Although potentially they could attend, there is no requirement for non-poor households to attend these courses and the evidence discussed above suggests that attendance among non-poor was almost null. The model generates three empirical predictions. While these are formally derived in the appendix, I summarize them below in an informal discussion:

1 Social learning should matter also for non-gender specific conditions such as hypertension and diabetes. Knowledge about healthy lifestyles (risks related to smoking, drinking, lack of physical exercise) and nutritional issues can play a key role in the prevention of diabetes and hypertension. Once cervical cancer is diagnosed it requires surgical treatment. This is not the case for hypertension and diabetes, where treatment mainly requires behavioral changes. Therefore, the benefits from increased information on hypertension and diabetes potentially are large. Moreover, the prevalence of hypertension and diabetes in the Mexican population is higher than the prevalence of cervical cancer.[30] The probability of sharing information with someone with direct experience of the disease is higher for hypertension and diabetes than for cervical cancer.

2 The weight of social learning should be bigger for non-poor than for poor households. In fact, once *PROGRESA* is in place, poor households update their priors using two different signals, the one received from peers and the one received through attendance at the health and nutrition classes. Non-poor households update their priors using only the information received from their peers. Since poor households have an additional source of information, they should give less weight to the information received from their peers.

3 Social learning should be more important for those individuals whose priors are less precise. The greater the precision of the information that an individual holds about a particular health condition and the benefits associated with screening, the lower the weight given to feedback from peers. This implies that, assuming that the precision of the signal does not change with household head gender, women in male headed

[30] In 2000, ENSA found that in the age group 20 and above the prevalence of diabetes was 7.8% among women and 7.2% among men. 79.5% (76.4%) of women(men) testing positive for diabetes were already aware of their condition. The prevalence of hypertension is 29%(32%) among women(men) aged 20 and above. 48%(31%) of women(men) diagnosed with hypertension were aware of their condition.

households will give more(less) weight to social learning than those living in widow headed households only if their priors about cervical cancer risk are less(more) precise.

I now discuss how the empirical evidence matches these three predictions. The first prediction implies that the interaction between the treatment effect and the fraction of eligible households should be positive and statistically significant for both hypertension and diabetes screening. The results in Table 6 show that for both types of screening the signs of the interaction terms do not follow a clear pattern and are never statistically significant irrespective of whether I consider the sample of poor or non-poor households.

The second implication of the learning model suggests that, regardless of the gender specific nature of the disease, the size of the interaction between the ITE and the proportion of eligible households should be bigger than the interaction between the ATE and the same proportion of households. Table 6 shows that there is no clear pattern to support the theoretical prediction. In particular, when I look at cervical cancer screening, I find that the size of the interaction between the ATE and the proportion of poor households is bigger than the interaction between the ITE and the fraction of poor households.

Third, the social learning model predicts that the size of the coefficient of the interaction term should reflect the precision of the prior for the risk of contracting a disease. I considered separately male headed and widow headed households. The results for hypertension and diabetes do not display a pattern consistent with the hypothesis that the two groups differ in the precision of their priors. If I look at cervical cancer screening, for both non-poor and poor households, the size of the interaction between the effect of *PROGRESA* and the fraction of poor is systematically bigger for the sample of male headed compared to widow headed households. This result would be consistent with the learning model only under the assumption that the prior about cervical cancer risk in male headed households is less precise than in widow headed households. The baseline characteristics in Table 1 show that female respondents in male headed households are more likely to be literate than the same type of respondents in widow headed ones; similarly the fraction of women in the household who have completed secondary school is higher among male headed than female headed households. The use of contraceptive methods is not directly linked to the risk of contracting cervical cancer. However, since cervical cancer is a sex related disease, women with better knowledge about contraceptive methods are more likely to know about the cervical cancer risk factors. Table 1 shows that the fraction of women that have never used contraception is higher among women living in widow headed than male headed households. Taken together, this evidence does not support the assumption that the prior for cervical cancer risk factors is less precise for women in male headed compared to widow headed households.

I investigate the third prediction further using direct questions on knowledge about contraceptive methods to construct a proxy for the preciseness of the knowledge on cervical cancer before the introduction of *PROGRESA*. The March 1998 survey asked female respondents why they were not doing/had never done anything to avoid pregnancies. They were given a list of reasons to choose from:[31] approximately 9% of the female respondents chose "I do not know about contraceptive methods: either how to use or where to obtain them". I construct a dummy variable that takes the value 1 if the respondent has no knowledge about contraceptive methods, and 0 if they used contraception or did not mention lack of information as reason for not using it. This is an imperfect proxy for the level of precision, since women who mentioned reasons other than lack of information for not using contraception might not necessarily be informed. However, among those who indicated lack of knowledge as the explicit reason for not using contraception there would potentially be greater benefit from information received from peers. I estimate equation (16) separately for those households where the female respondent had no knowledge and those where she has at least a little. The top(bottom) panel in Table 7 reports the results for non-poor(poor) households. According to my model, I should expect the coefficient of the interaction term to be significantly bigger for the groups with no knowledge about contraception. Among non-poor households, the coefficient of the interaction term is smaller and not statistically significant for the group with no knowledge than for the group with at least some knowledge. Among poor households, the coefficient of the interaction term is bigger for those with no knowledge, but is statistically not significant. In neither case is the difference between the coefficient for those with no knowledge and those with at least some, statistically significant.

In summary, the three predictions from the learning model are not consistent with the empirical evidence, at least for the sample of male and widow headed households we consider in this work. One possible explanation for this result might be related to the fact that the information received from peers does not add extra contents with respect to the information, both written and verbal, that women living in rural Mexico receive as part of the national screening program discussed in Section 2.1.

[31] Other choices included: a) partner's or family's opposition; b) having passed the menopause; c) not needed because partner is absent; d) sterility; e) lack of sexual relationship; f) willingness to become pregnant; g) fear of collateral effects; h) breastfeeding; i) other.

6 Long Run Evidence

Here I assess whether the long run evidence on the effect of *PROGRESA* is consistent with the results based on the randomized evaluation sample. I consider first the social norm mechanism. While the model presented in Section 5 is completely static, it is straightforward to derive its dynamic implications. In localities where the *PROGRESA* program has been in place for longer, there is a higher fraction of women familiar with the PAP test, as a result of the program's conditionalities. In the model presented in Section 5.1.1, this corresponds to a lower probability of matching with peers who do not screen. Therefore, I expect a higher screening rate for gender specific conditions in localities where the program started earlier.

Throughout the paper I have suggested that husbands' opposition (or simply fear of their opposition) to their women being screened for cervical cancer might be related to the gender of the doctor. Information on doctor's gender is available in the 2007 survey. If *PROGRESA* affected the propensity to screen by weakening the norm related to the possible reaction of husbands to their wives being screened by a male doctor, I expect the program to have a stronger effect in those localities where there is a higher fraction of male doctors.

In order to evaluate the effect of the length of participation in the program on female screening decisions and how this interacts with the probability of being screened by a male doctor, I restrict the sample to the localities included in the original evaluation sample and the localities selected to be in the control group in the 2003 survey. The latter group was chosen to match the observable characteristics of the villages in the original evaluation sample. The group of localities included in the evaluation sample and those added in 2003 differ in terms of exposure to the program: the first group received the program at the latest in November 1999, the second only in 2004 or later.

I create a dummy variable that takes the value 1 if the locality belonged to the original evaluation sample and 0 if it was one of those chosen as a control in 2003.[32] First I check how observable characteristics, elicited in 2007, are correlated with the exposure dummy. Since the questions on cervical cancer are only addressed to women aged 50 or younger,[33] the top panel in Table 8 reports the mean and the standard deviations of the demographic characteristics of women aged 18-50 in those localities where there is at least one operating health center. Characteristics are not balanced across the two groups. For instance, women who live in localities that received *PROGRESA* after 2003 display significantly higher levels

[32] The survey does not report administrative information on the exact date each village started receiving the program.

[33] Given this age restriction, I do not consider the samples of male and widow headed households separately.

of literacy and education than those living in localities that received the program before 2000.

Table 8 shows that localities where the program started later, on average, have a higher number of doctors and nurses, and more experienced (longer tenure) doctors. In 79% of the localities that received *PROGRESA* in 2004 or after there is at least one permanent health center that offers the cervical cancer screening service, as opposed to 69% in early exposure ones.[34] However, except for the number of nurses, the difference between early and late exposure localities is not statistically different from zero for the health center characteristics reported in Table 8.[35] The same pattern holds if I look at doctors' characteristics (bottom panel in Table 8). I proxy for the probability of being visited by a male doctor using the fraction of male doctors who operate in the locality. In early exposure localities, 55% of the doctors on average are male, as opposed to 54% in late exposure localities. In the group of localities added as controls in 2003 there is a higher fraction of doctors who have completed postgraduate studies (38% versus 20%) and a higher fraction of doctors who advise their patients to screen for cervical cancer (85% versus 71%) and breast cancer (77% versus 73%) at least once every two years.[36] Also, in this case, the differences between the two groups of localities are not statistically different from zero. In summary, the differences (if any) in health supply characteristics between early and late exposure localities should be associated with higher screening rates in the latter.

In order to test whether longer participation in *PROGRESA* affects the propensity to screen among women aged under 50 and whether the effect varies according to the proportion of male doctors operating in the locality, I estimate two specifications. In the first, presented in the odd numbered columns in Table 9, I regress the decision to screen on the dummy for whether the locality belongs to the original evaluation sample or not. In the second specification, presented in the even numbered columns in Table 9, I add a control for the proportion of male doctors in the locality and allow this variable to interact with the exposure dummy. All the specifications control for the following variables: i.e. age (in dummies), marital status, being literate, indigenous, head of household, completing primary, and secondary or higher school, number of children still living, working in the week before the interview, illness in the four weeks before the interview, a television and a radio in the house. The regressions control also for state fixed effects and for a set of health supply char-

[34]The fraction of localities where it is possible to screen should be higher since Table 8 does not take account of mobile units, for which I do not have information.

[35]Similar results are observed for characteristics not reported.

[36]According to the latest guidelines, Mexican women aged 40-49 should be screened for breast cancer once every two years, and once a year after the age of 50.

acteristics at locality level: number of doctors, number of nurses, total number of families registered with the health providers operating in the locality.[37] In localities with more than one health center I could potentially match each individual with the characteristics of the center they attend. However, the decision to attend a specific center might be driven by characteristics that are correlated with the strength of the social norm. Women who can choose between different providers operating in the same village might decide on the basis of attendance by a female rather than a male professional. However, it is unlikely that women would travel to another locality if there is at least one health center where they live.

Table 9 presents the results for the propensity to undertake five screening tests, for women aged 18-50: PAP test, mammogram, and tests for hypertension, diabetes and cholesterol. The patterns are similar for the two female specific screenings. Living in a locality that received *PROGRESA* in 1999 or before, rather than after 2003, significantly increases screening for cervical(breast) cancer by 0.14(0.06). I do not find any significant correlation between the exposure dummy and the propensity to screen for hypertension, diabetes and cholesterol. A higher fraction of male doctors in the locality is associated with a significantly lower probability to screen for female specific conditions. There is no evidence that this negative association is related to male and female doctors following different practices for female specific conditions: 82%(72%) of male doctors advised their patients to screen for cervical(breast) cancer at least once every two years, as opposed to 80%(73%) of female doctors. The fraction of male doctors has no effect on the probability that women screen for non-female specific conditions.

If I allow the exposure dummy to interact with the proportion of male doctors, I find that for cervical cancer and breast cancer screening - but not for the other health conditions, the effect of the exposure dummy tends to be significantly stronger in those localities where there is a higher fraction of male doctors.[38]

The 2007 ENCEL questionnaire contains a module that asks individuals aged 14-24 questions to assess their knowledge of health risks. These include a question about what the PAP test is for, specific questions on how to prevent unwanted pregnancies and sex related diseases (HIV and genital herpes). 83.5% of the women living localities that received *PROGRESA* before 2000 knew what PAP test is for compared to 82% of those in localities that received the program in 2004 or afterwards. 84.9%(81.8%) of those living in localities that

[37] This variable controls for possible congestion effects and accounts for the possibility that health centers are attended by households that live outside the village.

[38] In alternative specifications I add controls for experience, age, additional qualifications and doctors' working hours, as measured by the locality averages, and dummies for the composition of health providers in the locality: the results (available on request) are very similar to those presented.

received *PROGRESA* before 2000(after 2003) knew that HIV can be transmitted through sexual relations. For none of the questions is the level of knowledge of young women living in localities that received *PROGRESA* in 1999 or earlier and those that received it later, statistically different.

The results in this section, although not experimental, support the evidence based on the randomized evaluation sample. Overall, the evidence is consistent with the hypothesis that *PROGRESA* determines an increase in the social acceptability of the screening tests for female specific conditions. I find no evidence that the program improves knowledge about cervical cancer and sex related diseases.

7 Conclusions

Access to health care is often characterized by the presence of non-monetary costs. Social norms and lack of information can prevent individuals from demanding health services, even when these are being offered free of charge. In this paper I studied to what extent social norms and lack of information can affect demand for female specific medical screening, i.e. PAP smear test, in rural Mexico. I present evidence from the *PROGRESA* social assistance program on whether including cervical cancer screening among the conditions for the receipt of cash transfers affects the screening decisions of women living in ineligible households. I find that *PROGRESA* has a positive indirect effect on the demand for cervical cancer screening, but not on non-female specific health outcomes.

I investigated different potential channels through which *PROGRESA* might affect the propensity to screen for female specific conditions. I can rule out that my results are driven by changes in health supply and income spillovers from eligible to ineligible households. I focused on the role of social norms, and lack of information, as potential explanations. Men's opposition to their women being screened by male doctors is mentioned often as one of the reasons for low take up of cervical cancer screening among women living in rural Mexico. Evidence from the randomized evaluation sample and expansion of the program nationwide supports the hypothesis that *PROGRESA* has increased the social acceptability of female specific screening tests. I found no evidence to support the alternative explanation of social learning.

The findings in this paper have two important policy implications that could affect the design of health programs in both developing and developed countries. First, the design and evaluation of screening programs should take explicit account of potential externalities from eligible to ineligible individuals. Evaluation of a program's benefits might change substantially if externalities are considered. Second, cultural barriers need to be addressed explicitly if a program is to be effective. Increasing the proportion of female health professionals in areas with a high proportion of ethnic and religious minorities, for many women might increase the incentive for systematic screening. A third policy implication relates to the design of conditional cash transfer programs in poor countries. While health and nutrition courses are mainly addressed to mothers, my results suggest that improving men's awareness about female specific conditions is essential to facilitate women's access to health services.

My findings are relevant also for the evaluation of public policies and their potential spillovers. While previous work shows that welfare programs can affect the consumption and investment decisions of ineligible individuals through interaction with informal resource sharing institutions, such as family networks, I provide evidence that large scale interventions can weaken the cultural norms that prevent individuals from behaving optimally.

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8 Appendix: Model of Social Learning

The utility that individual i obtains from screening for a disease j is

$$U_{ij} = g_j + u_{ij} \tag{17}$$

where g_j represents the prevalence of condition j in the population. A higher risk of contracting a certain disease increases the utility from screening for it. u_{ij} is normally distributed - $\sim N(0, \frac{1}{b_j})$ - and represents how individual i differs from the average in terms of the risk of contracting condition j. I assume that g_j and u_{ij} are unobserved and individuals have a prior for the average risk of contracting condition j. I assume that

$$g_j \sim N(\mu_j, \frac{1}{d_j}) \tag{18}$$

where μ_j represents an individual's prior for the prevalence of condition j. d_j is the precision of the prior, which I assume is different across health conditions since the amount of information available to individuals may vary depending on the condition. All the individuals in the village, irrespective of their poverty status, update their prior on the utility from screening for condition j based on feedback from peers. I assume that each individual i has N_i peers. Of these N_i peers, n_{ij} screen for condition j and individual i aggregates these feedbacks to obtain an unbiased estimate of the average risk of contracting condition j. I call this estimate s_{ij} and, following Moretti (2011), it is possible to show:

$$s_{ij} \sim N(g_j, \frac{1}{\gamma_{ij}^0}) \tag{19}$$

where γ_{ij}^0 is the precision of the signal that individual i receives from his or her peers before *PROGRESA*. γ_{ij}^0 increases as the fraction of peers who screen $(\frac{n_{ij}}{N_i})$ increases.[39] The expected utility from screening for condition j of the representative individual is a weighted average of the prior (μ_j) and the peers feedback (s_{ij}), with the weights reflecting the relative precision of the prior and the signal:

$$E(U_{ij}|\mu_j, s_{ij}) = \omega_{ij}\mu_j + (1 - \omega_{ij})s_{ij} \tag{20}$$

with $\omega_j = \frac{k_j}{(k_j + \gamma_{ij}^0)}$ and $k_j = \frac{d_j * b_j}{b_j + d_j}$. Individual i, irrespective of whether she belongs to a poor or a non-poor household, screens for condition j if

[39] This property holds under very general assumptions about the model parameters.

$$E(U_{ij}|\mu_j, s_{ij}) \geq q_0 \tag{21}$$

where q_0 represents the cost (both monetary and non-monetary) of screening for condition j. There are two channels through which compliance with *PROGRESA* conditionalities affects the expected utility from screening for condition j. First, individuals in poor households have to screen for condition j in order to receive the transfer, which can be modeled as a reduction in the cost of screening ($q_1 < q_0$). As result, a higher fraction of poor women will screen for condition j. Each individual i, irrespective of poverty status, will observe an increase in the fraction of peers who screen. The precision of the signal received through peers' feedback increases ($\gamma_{ij}^1 > \gamma_{ij}^0$) and I assume that the increase in precision on average is the same for poor and non-poor households. This assumption is supported by the evidence provided by Angelucci et al. (2010b) for an important type of network, the family network: on average about 80% of both poor and non-poor households, irrespective of whether they are in treatment or control villages, belong to an extended family network within the same village.

Second, individuals in poor households have to attend health and nutrition classes where they learn about condition j. I assume that each poor individual who attends the classes receives a noisy, idiosyncratic signal about her utility from screening:

$$c_{ij}^P = U_{ij} + \epsilon_{ij} \tag{22}$$

I assume that the signal related to health condition j that individuals in poor household receive from the attendance at classes is unbiased and normally distributed with precision v_{ij}:

$$\epsilon_{ij} \sim N(0, \frac{1}{v_{ij}}) \tag{23}$$

Following the introduction of *PROGRESA*, the expected utility from screening an individual from a poor household is a weighted average of the prior, the signal she receives from her peers and the signal received through attendance at health courses. For non-poor households the expected utility is the weighted average of the prior and the peers' signal. Formally I can write the expected utility from screening for condition j for the representative individual in the group of poor households as follows:

$$E^P(U_{ij}|\mu_j, s_{ij}, c_{ij}^P) = \frac{k_j}{(k_j + \gamma_{ij}^1 + h_{ij})}\mu_j + \frac{\gamma_{ij}^1}{(k_j + \gamma_{ij}^1 + h_{ij})}s_{ij} + \frac{h_{ij}}{(k_j + \gamma_{ij}^1 + h_{ij})}c_{ij}^P \quad (24)$$

where $h_{ij} = \frac{d * v_{ij}}{d + v_{ij}}$.

For the representative individual in the group of non-poor households the average utility can be written as:

$$E^{NP}(U_{ij}|\mu_j, s_{ij}) = \frac{k_j}{(k_j + \gamma_{ij}^1)}\mu_j + \frac{\gamma_{ij}^1}{(k_j + \gamma_{ij}^1)}s_{ij} \quad (25)$$

From equations (24) and (25) it is immediate to derive 3 implications:

1 For any health condition j the weight of social learning, s_{ij}, can be equal to zero only if γ_{ij}^1=0;

2 For each condition j, the weight of social learning for individuals in poor households, $\frac{\gamma_{ij}^1}{(k_j+\gamma_{ij}^1+h_{ij})}$, is smaller than its weight for individuals in non-poor households, $\frac{\gamma_{ij}^1}{(k_j+\gamma_{ij}^1)}$

3 For each condition j, the weight of social learning should decrease as the precision of the prior (k_j) increases.

Figure 1: The Age Profile of Cervical Cancer Risk

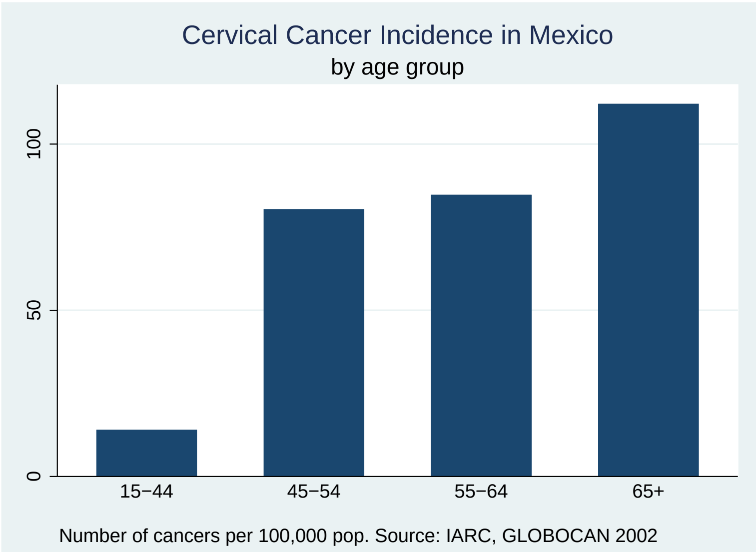

Table 1: Characteristics of Male Headed and Widow Headed Households

	(1) Male Head		(2) Widow Head		(3) Difference	(4) Diff. between Treatment and Control, Male Head	(5) Diff. between Treatment and Control, Widow Head
	Mean	SD	Mean	SD	P-Value	P-Value	P-Value
Individual Characteristics							
Age HH head	45.024	(14.733)	58.153	(12.173)	0.000	0.101	0.342
Age Wife	40.450	(13.653)				0.308	
Literacy Head (Y/N)	0.723	(0.447)	0.342	(0.475)	0.000	0.395	0.194
Literacy Wife (Y/N)	0.614	(0.487)				0.947	
Indigenous Head (Y/N)	0.350	(0.477)	0.350	(0.477)	0.996	0.723	0.452
Household Characterisitics							
Income AE	328.620	(330.650)	414.482	(448.460)	0.000	0.176	0.738
Wealth Index	728.7	(141.7)	767.4	(125.5)	0.000	0.365	0.889
PROGRESA Eligible	0.552	(0.497)	0.402	(0.490)	0.000	0.296	0.953
Household size	5.668	(2.432)	3.766	(2.515)	0.000	0.582	0.434
Numb. children	2.623	(1.964)	1.389	(1.715)	0.000	0.748	0.623
IMSS Coverage (Y/N)	0.045	(0.208)	0.010	(0.100)	0.000	0.156	0.786
Numb. Women 20-64	1.169	(0.598)	1.057	(0.834)	0.000	0.108	0.101
Frac educated women	0.089	(0.254)	0.042	(0.151)	0.000	0.802	0.395
Fridge (Y/N)	0.159	(0.366)	0.134	(0.340)	0.004	0.234	0.204
Heating (Y/N)	0.318	(0.466)	0.290	(0.454)	0.030	0.438	0.228
Tele (Y/N)	0.489	(0.500)	0.369	(0.483)	0.000	0.043	0.017
Radio (Y/N)	0.653	(0.476)	0.563	(0.496)	0.000	0.188	0.349
Land (Y/N)	0.641	(0.480)	0.593	(0.491)	0.003	0.320	0.081
Horses	0.403	(1.038)	0.216	(0.658)	0.000	0.512	0.378
Donkeys	0.398	(1.106)	0.255	(0.636)	0.000	0.461	0.711
Goats	1.552	(5.809)	1.623	(5.791)	0.648	0.191	0.414
Pigs	1.188	(2.886)	1.080	(3.522)	0.280	0.671	0.469
Cows	1.146	(3.801)	0.683	(2.732)	0.000	0.701	0.240
Chickens	7.179	(8.299)	6.574	(7.699)	0.003	0.262	0.582
Female Respondant							
Number of pregnancies	5.247	(3.335)	6.008	(3.791)	0.000	0.575	0.369
Never used contracep. (Y/N)	0.556	(0.497)	0.615	(0.487)	0.000	0.224	0.869
Never PAP Test (Y/N)	0.624	(0.485)	0.591	(0.492)	0.030	0.133	0.765
Female Status Index	1.943	(1.296)	1.775	(1.223)	0.000	0.431	0.314
Village Characteristics							
Wealth Index	730.7	(85.3)	732.7	(82.6)	0.202	0.507	0.879
Pregnancy Service	0.821	(0.384)	0.826	(0.380)	0.421	0.742	0.534
Vaccination Service	0.657	(0.475)	0.656	(0.475)	0.878	0.790	0.623

Note: The sample includes male and widow headed households with the female respondent in age group 18-80. The p-values on the differences are reported from the corresponding OLS regressions allowing standard errors to be clustered by village. All data is taken from October 1997 except for the sexual and female status related information for the female respondent, which are recorded in March 1998. Income per adult equivalent is expressed in pesos at October 1997 values. The Female Status Index is defined over the range 0-6, where 0 denotes the highest and 6 the lowest level of female emancipation. Village characteristics statistics use one observation per village.

Table 2: Descriptive Evidence on Health Supply

	(1)	(2)	(3)	(4)	(5)	(6)
	October 1997			October 1998		
	Treatment	Control	**Diff**	Treatment	Control	**Diff**
SSA clinic	0.079	0.130	-0.051*	0.097	0.108	-0.010
	(0.271)	(0.338)	(0.028)	(0.297)	(0.311)	(0.028)
IMSS Solid.	0.038	0.043	-0.006	0.028	0.022	0.007
	(0.191)	(0.204)	(0.018)	(0.166)	(0.145)	(0.015)
IMSS	0.003	0.000	0.003	0.003	0.011	-0.008
	(0.056)	(0.000)	(0.004)	(0.056)	(0.103)	(0.007)
Private Doctor	0.000	0.000	-	0.006	0.022	-0.015
	(0.000)	(0.000)	-	(0.079)	(0.145)	(0.010)
Health Aid	0.571	0.641	-0.070	0.633	0.602	0.031
	(0.496)	(0.481)	(0.045)	(0.483)	(0.491)	(0.045)
Mobile Unit	0.769	0.712	0.057	0.809	0.801	0.008
	(0.422)	(0.454)	(0.040)	(0.394)	(0.400)	(0.037)
Any of the providers	0.915	0.914	0.001	0.944	0.941	0.003
	(0.279)	(0.281)	(0.026)	(0.231)	(0.237)	(0.021)
Services available	2.358	2.454	-0.096	3.131	3.065	0.067
	(1.964)	(2.043)	(0.184)	(2.273)	(2.241)	(0.209)

	Additional Measures of Health Supply					
	March 1998			October 1998		
	Treatment	Control	**Diff**	Treatment	Control	**Diff**
Opening days	5.567	5.512	0.055	5.285	5.349	-0.064
	(0.783)	(0.705)	(0.070)	(0.832)	(0.784)	(0.075)
Opening hours	10.403	10.119	0.284	9.225	9.232	-0.006
	(3.019)	(2.829)	(0.272)	(2.144)	(2.493)	(0.210)
Waiting time	55.871	58.139	-2.268	56.048	58.477	-2.429
	(23.494)	(24.230)	(2.195)	(19.813)	(19.090)	(1.804)
Visit duration	19.151	19.775	-0.623**	19.134	19.157	-0.022
	(3.169)	(3.067)	(0.289)	(3.304)	(3.357)	(0.307)
Visit fee	11.057	11.988	-0.930	5.475	9.769	-4.294***
	(10.021)	(10.166)	(0.931)	(7.035)	(10.730)	(0.792)

Note: *** denotes significance at 1%, ** at 5% and * at 10%. The reported differences are the coefficients from the corresponding OLS regressions that allow standard errors to be clustered by village. Standard deviations are reported in parenthesis. The number of main services available is obtained from a list of 7 services in the locality questionnaire. Measures reported in the bottom panel are averages of the individual responses. Visit durations and waiting times are expressed in minutes. Consultation fees are expressed in pesos at October 1997 values.

Table 3: Descriptive Evidence on Screening Rates

	(1)	(2)	(3)	(4)	(5)	(6)
		Poor			Non-Poor	
	Treatment	Control	**Diff**	Treatment	Control	**Diff**
Cervical Cancer Screening						
Mar-98	0.265	0.28	-0.015	0.331	0.363	-0.032
	(0.441)	(0.449)	(0.022)	(0.471)	(0.481)	(0.022)
May-99	0.609	0.389	0.219***	0.478	0.457	0.021
	(0.488)	(0.488)	(0.025)	(0.500)	(0.498)	(0.022)
Diff	0.344***	0.110***	0.234***	0.147***	0.094***	0.053**
	(0.008)	(0.011)	(0.023)	(0.014)	(0.015)	(0.021)
Blood Sugar Screening						
Mar-98	0.254	0.254	0.001	0.316	0.307	0.009
	(0.436)	(0.435)	(0.020)	(0.465)	(0.461)	(0.020)
May-99	0.644	0.426	0.218***	0.557	0.545	0.012
	(0.479)	(0.495)	(0.025)	(0.497)	(0.498)	(0.021)
Diff	0.390***	0.172***	0.218***	0.241***	0.238***	0.003
	(0.008)	(0.011)	(0.024)	(0.012)	(0.014)	(0.018)
Blood Pressure						
Mar-98	0.394	0.389	0.006	0.463	0.467	-0.003
	(0.489)	(0.488)	(0.023)	(0.499)	(0.499)	(0.021)
May-99	0.77	0.551	0.220***	0.685	0.665	0.020
	(0.421)	(0.497)	(0.026)	(0.465)	(0.472)	(0.020)
Diff	0.376***	0.162***	0.214***	0.221***	0.198***	0.023
	(0.008)	(0.011)	(0.023)	(0.013)	(0.013)	(0.018)

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Standard errors on the differences are derived from an OLS regression and are clustered by village. In March 1998 the questions about screening refer to the previous 12 months. Since in October 1998 and May 1999 they refer to the previous 6 months, the cumulative probabilities in May 1999 are reported. The sample includes both male and widow headed households. The screening indicator takes value 1 if at least one household member has been screened.

Table 4: *PROGRESA* and the demand for screening

	(1)	**(2)**	**(3)**
	Cervical Cancer Screening	Blood Sugar Screening	Blood Press. Screening
ITE	0.046**	-0.006	0.011
	(0.021)	(0.019)	(0.019)
Observations	16046	17255	17401
ATE	0.226***	0.209***	0.207***
	(0.024)	(0.024)	(0.024)
Observations	18888	19744	19833

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Standard errors are clustered by village. All the specifications control for the following sociodemographic characteristics as elicited in the baseline survey: gender, the age dummies, the literacy of the household head, a dummy for whether (s)he speaks the indigenous language, the household poverty index, the household's size, number of children, whether the household is covered by an *IMSS* insurance cover, the number of women in the age group 20-64, the proportion of women over 18 with a secondary school degree, dummies for whether the household owns television, radio and land, the average poverty index in the locality and state fixed effects. Health supply variables are measured both in the baseline and follow-up survey and include the locality average waiting time for being seen by a doctor and dummies for the health providers available in the locality.

Table 5: *PROGRESA* and alternative health outcomes

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	Health Center Visit	Health Expenditure	Drug Expenditure	Pregnancy Checks	Tetanus Vaccination
ITE	-0.003	0.501	-0.723	0.133	-0.084
	(0.019)	(3.505)	(1.682)	(0.341)	(0.070)
Observations	18002	17910	17937	537	651
ATE	0.161***	-2.085	-2.694**	0.233	0.065
	(0.021)	(2.979)	(1.246)	(0.309)	(0.061)
Observations	20411	20329	20349	813	1056

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Standard errors are clustered by village. The health center visit takes the value 1 if at least one household member visited a health center in the previous six months. The health and drug expenditures are expressed in pesos at October 1997 values. The tetanus vaccination takes the value 1 if the woman received vaccination against tetanus during pregnancy. All the specifications control for the sociodemographic and health supply characteristics described in Table 4.

Table 6: Treatment Heterogeneity

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Cervical Cancer Screening		Blood Sugar Screening		Blood Pressure Screening	
	Male Head	Widow Head	Male Head	Widow Head	Male Head	Widow Head
ITE	-0.019	0.040	0.011	-0.124	0.015	-0.019
	(0.041)	(0.085)	(0.032)	(0.079)	(0.036)	(0.083)
Ratio Eligibles	-0.051	-0.039	-0.179**	-0.427**	-0.160**	-0.586***
	(0.108)	(0.189)	(0.081)	(0.212)	(0.079)	(0.224)
ITE*Ratio Elig.	0.154**	-0.038	-0.026	0.136	-0.010	0.080
	(0.075)	(0.154)	(0.063)	(0.155)	(0.072)	(0.161)
Observations	14689	1357	15669	1586	15799	1602
ATE	0.122**	0.255**	0.166***	0.280**	0.141***	0.279***
	(0.050)	(0.127)	(0.051)	(0.119)	(0.047)	(0.107)
Ratio Eligibles	0.026	0.178	-0.076	0.249	-0.101	0.106
	(0.102)	(0.209)	(0.084)	(0.194)	(0.076)	(0.203)
ATE*Ratio Elig.	0.172*	-0.040	0.067	-0.143	0.102	-0.098
	(0.088)	(0.181)	(0.087)	(0.180)	(0.082)	(0.154)
Observations	17781	1107	18478	1266	18564	1269

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Standard errors are clustered by village. Ratio elig. represents the fraction of poor households in the locality and is defined over the range between 0 and 1. All the specifications control for the sociodemographic and health supply characteristics described in Table 4.

Table 7: Heterogeneity by Knowledge of Contraceptive Methods

	(1)	(2)
	Cervical Cancer Screening	
	Some Knowledge	No Knowledge
ITE	-0.015	-0.042
	(0.044)	(0.151)
Ratio Eligibles	-0.031	-0.379
	(0.110)	(0.274)
ITE*Ratio Elig.	0.151*	0.093
	(0.081)	(0.241)
Observations	12462	779
ATE	0.111**	0.120
	(0.053)	(0.098)
Ratio Eligibles	0.053	0.064
	(0.107)	(0.240)
ATE*Ratio Elig.	0.172*	0.199
	(0.093)	(0.134)
Observations	14210	1780

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Standard errors are clustered by village. Female respondents are classified as having some knowledge of contraceptive methods if they report having used contraceptive methods or they report reasons for not using other than the lack of knowledge. They are classified as having no knowledge if they reported not using contraceptive methods because they did not know either how to use them or where to obtain them. All the specifications control for the sociodemographic and health supply characteristics described in Table 4.

Table 8: Characteristics in 2007 Survey by Time of Inclusion in *PROGRESA*

	(1)		(2)		(3)
	Before 2000		After 2003		**Difference**
	Mean	SD	Mean	SD	**P-Value**
			Characteristics Women 18-50		
Age	30.312	(8.503)	30.756	(8.759)	0.020
Literacy (Y/N)	0.775	(0.417)	0.855	(0.352)	0.032
Indigenous (Y/N)	0.294	(0.456)	0.189	(0.392)	0.349
Married (Y/N)	0.528	(0.499)	0.568	(0.495)	0.318
Primary School (Y/N)	0.304	(0.460)	0.355	(0.479)	0.024
Sec. School or Above (Y/N)	0.089	(0.285)	0.140	(0.347)	0.083
Children	3.902	(2.221)	3.799	(2.103)	0.574
Last Week Worked (Y/N)	0.225	(0.417)	0.246	(0.431)	0.543
Sick Last Month (Y/N)	0.168	(0.374)	0.188	(0.391)	0.385
			Household Characteristics		
Television (Y/N)	0.791	(0.407)	0.876	(0.330)	0.074
Radio (Y/N)	0.187	(0.390)	0.115	(0.319)	0.002
PC (Y/N)	0.010	(0.099)	0.018	(0.133)	0.181
Refrigerator (Y/N)	0.491	(0.500)	0.640	(0.480)	0.011
Wash Mach. (Y/N)	0.137	(0.344)	0.194	(0.395)	0.119
Horses	1.612	(0.721)	1.721	(1.026)	0.488
Pigs	5.049	(8.096)	3.568	(3.387)	0.041
Cows	3.853	(3.856)	6.336	(7.778)	0.161
Chickens	1.001	(0.039)	1.002	(0.044)	0.824
			Health Center Characteristics		
Number of Doctors	1.214	(1.457)	1.714	(1.383)	0.207
Doctors Tenure (Months)	31.226	(44.867)	41.265	(39.696)	0.414
Doctors Working Days	5.163	(1.239)	5.031	(0.528)	0.542
Number of Nurses	0.929	(0.818)	1.857	(1.994)	0.081
Nurses Working Days	4.494	(1.300)	4.682	(0.560)	0.435
PAP Test Available	0.687	(0.467)	0.786	(0.426)	0.420
Diabetes Test Available	0.702	(0.460)	0.857	(0.363)	0.152
			Doctor Characteristics		
Fraction Males	0.551	(0.493)	0.538	(0.519)	0.938
Doctors Age	33.821	(10.822)	34.692	(10.086)	0.779
Fraction with Postgrad. Studies	0.196	(0.401)	0.385	(0.506)	0.205
Fraction Advised PAP Test	0.711	(0.448)	0.846	(0.376)	0.257
Fraction Advised Mammogram	0.729	(0.439)	0.769	(0.439)	0.763

Note: The sample is restricted to localities with at least one health facility, belonging either to the original evaluation sample or to the sample of those that acted as control group in the 2003 survey. The p-values on the difference are obtained from an OLS regression that allows for standard errors clustered by village. It includes all women in the age group 18-50. Health center and doctor characteristics use one observation per village.

Table 9: Female Screening Decisions and Exposure to *PROGRESA*

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	PAP Screening		Breast Screening		Blood Pressure Screening		Blood Sugar Screening		Cholesterol Screening	
PROGRESA Before 2000	0.139**	-0.028	0.056***	-0.009	-0.023	0.031	-0.012	-0.043	0.003	0.004
	(0.057)	(0.065)	(0.020)	(0.045)	(0.027)	(0.040)	(0.023)	(0.034)	(0.008)	(0.014)
Frac. Male Doctors		-0.187***		-0.100**		0.089*		0.001		0.025
		(0.066)		(0.049)		(0.045)		(0.042)		(0.023)
Before 2000*Frac. Male Doctors		0.195**		0.125*		-0.080		0.065		-0.011
		(0.076)		(0.066)		(0.052)		(0.047)		(0.023)
Socioeconomic Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health Supply	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2264	1849	2267	1851	2267	1851	2267	1851	2267	1851

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Standard errors are clustered by village. The sample includes women aged 18-50. The dummy *PROGRESA* Before 2000 takes value 1 for those localities that belonged to the original evaluation sample, 0 for those that acted as control in the 2003 survey. The fraction of male doctors is defined on the range between 0 and 1. The socioeconomic characteristics include dummies for age, marital status, being literate, indigenous, head of household, for completing primary, secondary or higher school, number of kids alive, a dummy for working the weak before the interview, a dummy whether the woman was sick in the last four weeks, whether in the house there is a television and a radio. The health supply characteristics are measured at the locality level and include the number of doctors, the number of nurses, and the total number of families that have registered with the health providers operating in the locality. All the regressions control for state fixed effects.

Table 10: Sex Related Knowledge of Young Women and Exposure to *PROGRESA*

	(1)		(2)		(3)	(4)
	PROGRESA Before 2000		PROGRESA After 2003		**Difference**	Observations
	Mean	SD	Mean	SD	**P-Value**	
Do you know what PAP Test is for? (Y/N)	0.835	(0.371)	0.819	(0.386)	0.726	1332
Can a woman get pregnant at the first intercourse? (Y/N)	0.712	(0.453)	0.667	(0.472)	0.189	1429
Is condom an anti-contraceptive method? (Y/N)	0.822	(0.382)	0.810	(0.393)	0.710	1659
Did you ever hear about emergency contraception? (Y/N)	0.366	(0.482)	0.310	(0.463)	0.260	1728
Did you ever hear about genital herpes? (Y/N)	0.244	(0.429)	0.224	(0.418)	0.608	1729
Can genital herpes the risk of contracting HIV/AIDS? (Y/N)	0.684	(0.466)	0.667	(0.474)	0.768	382
Can genital herpes be prevented? (Y/N)	0.887	(0.317)	0.943	(0.234)	0.199	414
Can HIV be transmitted through sexual relations? (Y/N)	0.849	(0.358)	0.818	(0.386)	0.485	1601
Can condom reduce the risk of STDs? (Y/N)	0.812	(0.391)	0.792	(0.406)	0.718	1611

Note: The sample includes women in the age group 14-24. The p-values on the difference are obtained from an OLS regression that allows for standard errors clustered by village.